Chapter 6
Documents for Design and Construction of SVE/BV Systems

6-1. Introduction

This chapter discusses the prescribed formats for the development of full-scale design documents for SVE/BV. The design analysis must include a complete narrative description as well as supporting calculations including the material balances and modeling assumptions and results. This information is required to be submitted as part of the design package; however, it is not required to be included as part of the construction bid package issued to contractors.

6-2. Applicable USACE Design Policy and Requirements

The following USACE regulations apply to the development of design documents in their various stages for the USACE:

Regulation	Title
1110-2-1150	Engineering and Design for Civil Works Projects
1110-345-100	Engineering and Design - Design Policy for Military Construction
1110-345-700	Engineering and Design - Design Analyses, Drawings, and Specifications
1165-2-132	Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects
1180-1-6	Construction Quality Management

6-3. Design Document Components

This paragraph outlines the contents of various design packages that are typically prepared to procure SVE/BV systems. Content of the packages depends on the acquisition strategy, customer requirements, and regulator requirements. USACE-CEGS Guide Specifications for Military Construction which are typically included or can be modified for SVE/BV design are listed beneath each design component. A potential specification section shown ending in "XXX" is one for which a CEGS does not currently exist but which is under development or should be developed based on the project requirements. The designer should always check the TECHINFO web site for the most recent versions of all guide specifications and the addition of new ones.

a. List of specification sections.

(1) Work plans.

01240 Cost and Performance Report

01270 Measurement and Payment

01320 Project Schedule

01330 Submittal Procedures

01351 Safety, Health, and Emergency Response (HTRW/UST)

01355 Environmental Protection

01450 Chemical Data Quality Control

01451 Contractor Quality Control

01780 Closeout Submittals

01xxx Sampling, Analysis, and Disposal of Waste

01810 Commissioning and Demonstration for Soil Vapor Extraction (SVE) Systems

01830 Operation, Maintenance, and Process Monitoring for Soil Vapor Extraction (SVE) Systems

(2) Site work.

02111 Excavation and Handling of Contaminated Material

02120 Transportation and Disposal of Hazardous Materials

02210 Subsurface Drilling, Sampling and Testing

02220 Demolition

02230 Clearing and Grubbing

02260 Soil-Bentonite Slurry Trench for HTRW Projects

02300 Earthwork

02316 Excavation, Trenching and Backfilling for Utilities Systems

02372 Waste Containment Geomembrane

02373 Separation/Filtration Geotextile

02374 Geosythetic Drainage Layer

02570 Valve Manholes and Piping and Equipment in Valve Manholes

02741 Hot-Mix Asphalt (HMA) for Roads

02754 Concrete Pavements for Small Projects

02975 Sealing of Cracks in Bituminous Pavements

(3) Well specifications.

02522 Vapor Monitoring Wells (Ground Water Monitoring Wells Specification can be modified)

02521 Vapor Extraction Wells (Water Well Specification can be modified for SVE/BV wells)

(4) Treatment specifications.

For example:

11215 Fans/Blowers/Pumps; Off-Gas

11226 Vapor Phase Activated Carbon Adsorption Units

11378 Thermal (Catalytic) Oxidation Systems

11393 Filtration System

11500 Air Pollution Control

02150 Piping: Off Gas

(5) Control, instrumentation, and wiring specifications and diagrams.

11XXX Instrumentation and Controls (may be included in blower specification)

(6) Piping layout.

11XXX Piping, Valves, and Appurtenances

11XXX Condensate Control

(7) Component specifications.

15080 Thermal Insulation for Mechanical Systems (if applicable)

(8) Electrical/control specifications.

16370 Electrical Distribution System, Aerial

16375 Electrical Distribution System, Underground

16415 Electrical Work, Interior

16475 Coordinated Power System Protection

b. Information to be included in a Request for Proposal (RFP) for services. (For a performance requirement for the entire system, including operation.)

(1) Operating parameters, ranges, and goals.

01XXX Summary of Work (Including criteria for judging adequate performance, such as total and per-well flows, clean-up goals, monitoring requirements, etc.)

(2) Refer also to paragraph 6-3a for List of Division 1 through 16 Specifications. Note that many of these would not be applicable to a request for proposal

c. Drawings. (Fewer drawings would be required for designs using package systems and performance-based RFPs.)

- Site location.
- Plan and profile.

- Well construction and surface cover details.
- Exterior details.
- Process and Instrumentation Diagram.
- Piping and equipment layout.
- Piping sections.
- Interior details.
- Power plan.
- Power/control plans.
- Electrical details.
- Lighting, power, and one-line electrical diagrams. Areas with NFPA hazard classifications that require upgraded/special electrical components should be shown on the drawings.

d. Other typically required specifications.

01500 Temporary Construction Facilities

13121 Metal Building Systems (Minor Requirements)

13405 Process Control

15400 Plumbing, General Purpose

6-4. System Construction and Construction Oversight

a. Sequence. Soil vapor extraction system construction includes the installation of wells, piping, above ground equipment, and controls. Installation of the wells prior to construction (or rental - see paragraph 11-4c of the above ground extraction and treatment allows the flow rate and initial vapor concentrations to be verified prior to commitment to a specific design for these costly items. Separate contracts for the wells and the above ground equipment may be desirable. To be most effective, the procurement of the aboveground equipment should lag well installation. As an alternative, the construction and operation of portions of a large system can be phased to allow for improved understanding of the subsurface performance from the early phases to better tailor the subsequent spacing of wells and sizing of aboveground equipment.

b. *Construction Oversight*. Refer to EP 415-1-261, Volume 5, Chapter 6 for instructions on the oversight of construction of SVE (and BV) systems. That document provides additional information on submittals, materials, and execution of construction.